Animal Biodiversity

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for Biodiversity

"The great diversity of livestock breeds, along with the great diversity of domestic plant varieties, can be thought of as a sort of vocabulary with which we may make appropriate responses to the demands of a great diversity of localities."

Wendell Berry

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Animal Biodiversity

Until 10,000 years ago, humans were hunter-gatherers. They lived in small groups of a few dozen individuals and moved around continuously in search of animals to hunt.

When they found large herds, they would pen them on cliffs and crags but, since they still had no knowledge of methods of conservation, they often had to abandon the carcasses without managing to eat all the meat. The leftovers were abandoned for animals or birds to finish off.

The first animals to be domesticated were dogs around 15,000 years ago, followed by sheep and goats, both small and frugal.
Then came cattle, almost all descendants of *Bos primigenius.*

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Only 40 of the 50,000 known wild species of mammals and birds have been domesticated, and only 18 of these are mammals.

Five of them (cattle, sheep, birds, goats and pigs) are distributed in high numbers on a large scale. Six of them (cattle, sheep, goats, pigs, horses and donkeys) are spread over every continent, while another nine (dromedary camels, Bactrian camels, llamas, alpacas, reindeer, water buffalo, yak, banteng and gayal, or mithun) are important only in limited areas of the globe.

Numbers of domesticated birds are even lower and total only ten species (hens, ducks, Muscovy ducks, geese, guinea fowl, ostriches, pigeons, quails and turkeys) out of 10,000, excluding ornamental, game and fighting birds.

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Why have so few species been domesticated?

Because the characteristics that are useful for humans are rarely found together in a single species.

The first livestock breeders selected the least aggressive animals with a strong gregarious instinct, especially those with the most-developed aptitude to follow and obey a leader, or which tended to panic least and were able to reproduce in captivity. It is also simpler to domesticate herbivores than carnivores because plants are easier to procure than meat. Last but not least, the most useful animals are the ones with the fastest growth rate, with short periods between births, and with large litters or broods.

Domesticated breeds are smaller than the wild ones from which they originated (though domestic birds are, on average, larger than their wild relatives), hence easier to raise; achieve sexual maturity earlier; have a greater proportion of muscle mass (hence more meat, especially, in the case of bovines, in their hindquarters); and a greater percentage of fat, sometimes concentrated in given parts of the body (a zebu's hump, for instance, and the tails of many old sheep breeds, such as the Laticauda in the south of Italy). In some breeds, such as Alpine sheep, coat or fleece thickness is the result of adaptation to the cold mountain climate.

Thousands of different breeds have resulted from the 40 domesticated species thanks to the adaptation of animals to the environment and selection by humans, who have always sought to develop the most useful characteristics through deliberate interbreeding.

What is a breed?

A **breed** is a group of domestic animals of the same species with physical characteristics (size, color of coat or plumage, shape of head, limbs, horns, tail and so on) and performance (productivity in terms of egg, milk or meat yield, resistance to cold, ability to feed even in difficult conditions, prolificness and so on) that parents pass on to their young.

A breed is defined as **native or local** when its characteristics are tied to the climate and geographical and socio-economic conditions of the area in which it has developed or to which it has adapted over time. A local breed is capable of living even in extreme habitats since it requires less care and needs less food. The Villasau sheep, for example, is one of the oldest sheep breeds left in Northern Europe, managing to survive even among the rocks and meager pastures of Norway's icy northwest coast.

With the help of researchers, breeders began to catalogue breeds just over a century ago, and today a breed is called so only if it is officially registered.

If characteristics are defined but not yet stable (to the extent that the young may not be the same as their parents), we speak of **populations** as opposed to breeds.

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Many breeds were selected in the Middle Ages by nobles and monks, and began to be officialized by registers and associations in the 19th century.

A number of important breeds were selected on islands (Jersey and Guernsey cattle, for example) or in marginal mountain areas (Simmental, Brown Swiss, Aberdeen Angus, Piedmontese, Galloway, Highland cattle), where isolation and difficult environmental conditions favored the development of notable physical robustness.

The main European breeds spread around the world from the 19th century to the middle of the 20th century.

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THE BIG FIVE

The world's most common domesticated species

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There are 1.5 billion cattle on the planet, one for every five people. Thirty-two percent of these are bred in Asia and 28 percent in Latin America (Brazil is the country with the highest number of cattle in the world). Of the ten main cattle breeds, eight are European and have been exported from the Old Continent virtually all over the world.

The most common is the Holstein-Friesian, which lives in 128 countries, followed by the Jersey (82), the Simmental (70), the Brown Swiss (68) and the Charolais (64). Almost all are native to Europe (especially the United Kingdom, followed by France, Switzerland and the Netherlands).

The Friesian produces large quantities of milk and is perfect for barn breeding, even in large numbers (some livestock farms keep as many as 1,000 head). Over the years, increasingly audacious selections have raised its yield to 60 liters of milk a day in periods of maximum production. In other words, the breed is a veritable milk machine living in closed spaces and feeding on high-protein feed made up mainly of maize and soybeans. It is an animal that "wears out" quickly and is slaughtered at the age of four or five years, whereas a cow from a traditional breed can live to 20 or 25.

Cattle breeds raised in industrial systems are artificially inseminated, with breeders buying semen from a few multinational breeding companies according to their needs. Even commercial breeds, such as the Friesian itself, have grown weaker with time. Fewer and fewer male reproducers are being selected by breeding companies, and the animals bred by large milk and meat producers are becoming genetically closer, hence more fragile.

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Sheep

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There are 1.2 billion sheep on the planet, about one for every six people, 40 percent of which are bred in Asia, especially in China, India and Iran.

The sheep is the most widespread domestic species thanks to its multi-purpose qualities (it produces milk, meat and wool). It is suited to a variety of habitats and, unlike cattle, goats and pigs, is consumed in all the major religions.

The most common sheep breed is the Suffolk (which originated in England and is now widespread in 40 countries), followed by the Spanish Merino and the Dutch Texel. If we consider all the strains descended from the original Merino, this breed jumps to first place.

Almost all the most widespread sheep breeds originated in Britain and were exported to America and the Pacific by British colonialists. Most of the 440 crossbreeds produced in the last four centuries have come from European sheep.

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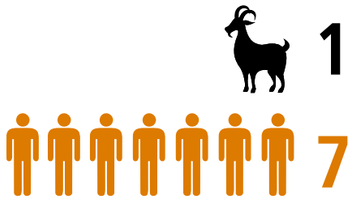

The goat is the least numerous of the world's most farmed species. There are approximately one billion of them on the planet, one for every eight people. Seventy percent of them live in Asia, especially in China, India and Pakistan.

For small breeders in the global south and, in general, for all those who live in marginal arid or mountainous areas, the goat is the most useful species insofar as it survives where other domestic animals cannot.

The most widespread goat breed is the Swiss Saanen; followed by the Toggenburg, also Swiss; the Anglo-Nubian, which originated in Britain; and the Turkish Angora, highly prized for the quality of its wool. The Saanen goat produces large amounts of milk but is unable to live on rough, inaccessible pasture and struggles to scale rocks to look for grass and herbs.

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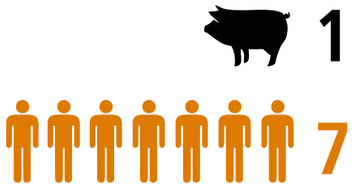

There are almost one billion pigs in the world, one for every seven people. Two thirds are in Asia, mainly in China, but also in Vietnam, India and the Philippines. In the 18th century, lightweight pigs were imported to Europe from China and Southeast Asia and crossed with local black breeds descended from wild boar. The resulting crossbreeds were the ancestors of modern European pigs.

The most common pig breed is the Large White. It has good meat yield and is ideal for the industrial production of cured meats, but it would struggle to live off acorns and woodland tubers as its ancestors did.

Pigs are artificially inseminated, with breeders choosing and buying the right semen from breeding companies' catalogues in order to have animals for the production of meat, cured meats and so on. Sows are selected according to their prolificness, though it is unnecessary for them to be good nourishers, since piglets are taken from their mothers very early to be fattened. World genetics is controlled by the French multinational Grimard, which took over Monsanto Swine Genetics in 2008.

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There are 21 billion chickens in the world, 2.5 for every person. Half are raised in Asia and 25 percent in Latin America and the Caribbean.

Chicken breeds account for 63 percent of all domestic bird breeds. The most common is the White Leghorn, thanks to the huge amount of eggs it lays (280 a year). It was developed in the USA from the Lewghorn breed, which was exported there in the first decades of the 19th century. It is now found all over the world. In terms of numbers, it is followed by the New Hampshire and the Plymouth Rock, both selected in the second half of the 19th century. Some of the other most common breeds originated
in Asia. They include the Indian Aseel and the Chinese Brahma, Cochin—developed in the United States in particular—and the Silkie. Among them is an ancestral breed from which all the modern chicken breeds have descended, the Jungle Fowl of Southeast Asia.

There are egg-laying, meat-type, dual-purpose, fighting and ornamental breeds. The global north is dominated by commercial egg-laying chickens and broilers, suitable for intensive battery farming. Broilers are the result of cross-breeding according to secret formulas. Two multinationals control the market of egg-laying hens (the German Wesjohann and the Dutch Hendrix Genetics), whereas another two (the American Tyson Foods and the French Grimaud) control the meat-type ones. From the study of genetics (including on organic farms) to feed, from the use of pharmaceuticals to slaughtering, processing, and the production of ready meals, the entire supply chain is controlled by these giants, which supply fast food chains, collective catering and large-scale retail distribution.

In Europe and North America, local breeds, such as the Alsatian Chicken in France, the Chaam in the Netherlands and the Padovana in Italy, have virtually disappeared and survive essentially thanks to amateur breeders. In the global south, however, local breeds continue to play a fundamental role, in certain countries accounting for 70 percent of the domestic bird population.

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A wealth of animal diversity is becoming extinct

*Today about 8774 animal breeds are used for food (for their meat and for their milk). According to the FAO, 17 percent of them risk extinction, and 54 percent are potentially at risk, though not enough information is available. The state of animal biodiversity linked to food production may be worse than it appears from the figures.

In Europe, half the breeds living at the start of the 20th century—including the Campurriana cow in Spain, the Drama black sheep in Greece, and the Huttegem chicken in Belgium—are now extinct. One third of the remaining 770—the Limpurg cow in Germany and the Provençal goat in France, for example—risk becoming extinct in the next 20 years. In Germany only five of the original 35 or so indigenous bovine breeds still survive, while in North America more than a third of all domestic breeds are considered either rare or in decline.

Most of the blame for all this can be attributed to industrialization and the consequent flight from the countryside which, in the 20th century, redesigned agriculture and animal husbandry, rapidly spreading forms of often large-scale intensive farming in many parts of the world. The industrial production of meat, milk and eggs is based on a limited number of high-yield breeds—no more than 30 or so—suitable for intensive breeding.

The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture

Natural epidemics and disasters (including drought, floods and military conflict) may be decisive for the extinction of local breeds. In 2003 in Vietnam, a country with one of the highest levels of bird biodiversity, 43 million chickens—namely 17 percent of the bird population, including many native breeds—were put down due to the threat of bird flu.

The export of animals from countries in the global north to the global south of the world could endanger biodiversity. These animals are intended to replace the local breeds considered least productive, but often fail to adapt to their new environments and repeat their habitual performances.

The world is thus losing not only its wild animals—the Siberian tiger, the Indian elephant, the African wild dog, the fin whale—but also the animal breeds selected by people that have accompanied the life and development of human communities over thousands of years.

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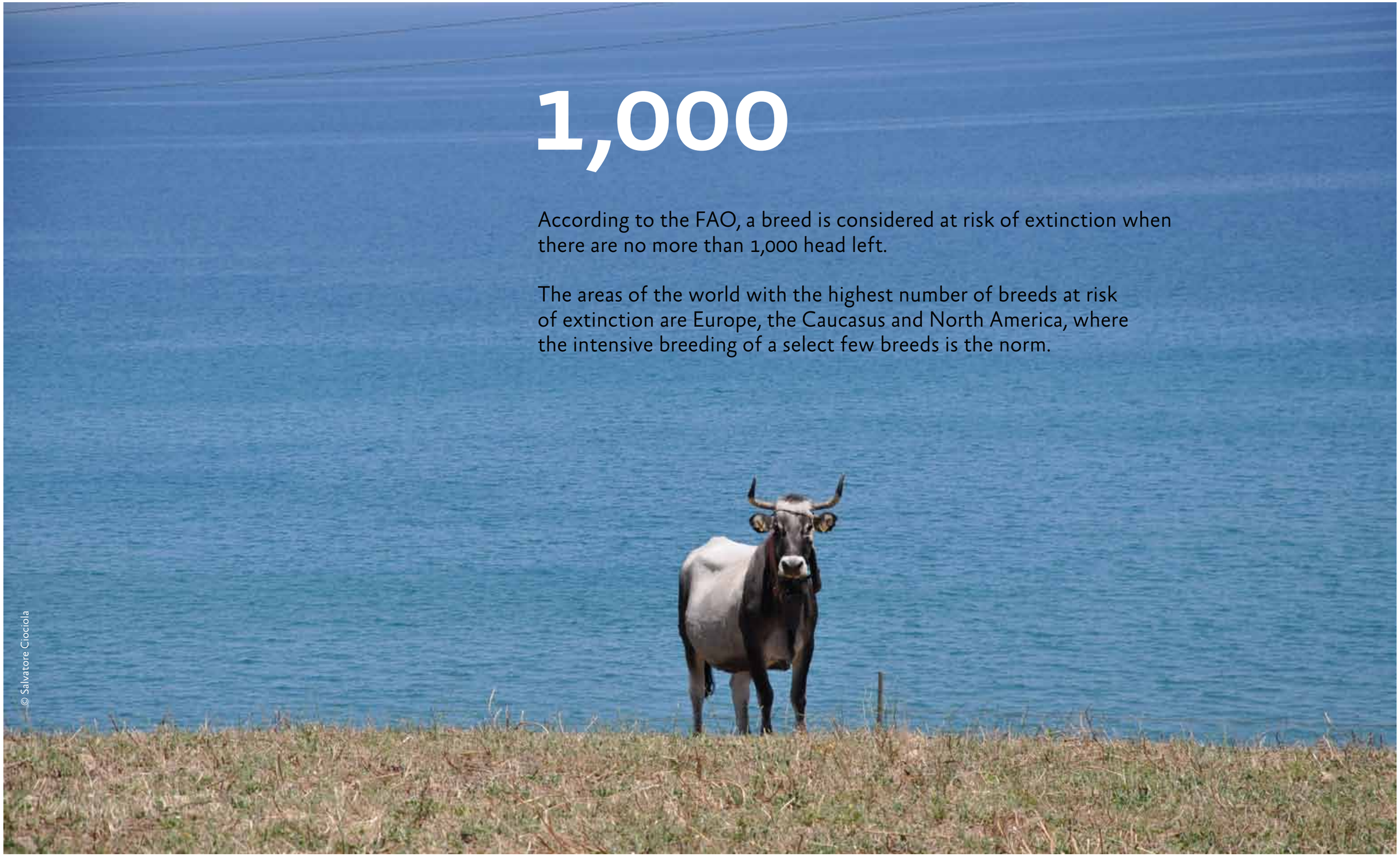
1,000

According to the FAO, a breed is considered at risk of extinction when there are no more than 1,000 head left.

The areas of the world with the highest number of breeds at risk of extinction are Europe, the Caucasus and North America, where the intensive breeding of a select few breeds is the norm.



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Why is it necessary to save local breeds?

- Because over time they have adapted to diverse climates and environments, to rough, hostile habitats (desert, tundra, swamp...) and marginal areas where the human presence is a bulwark defending the land.
- Because if they are raised sustainably in their areas of origin, local breeds provide high-quality milk and meat for the making of cheese, charcuterie and other products, a heritage of gastronomic traditions handed down through the centuries in small local communities. Native bovines generally produce lower amounts of milk than commercial breeds, but it is often richer from a nutritional point of view and has a high fat and casein content, an important factor for quality cheesemaking.
- Because the genetic inheritance of local breeds is useful to research, also in the industrial sector, for the selection of the most resilient, hardy animals. More genetically diverse animal populations are also less vulnerable to large-scale epidemics. Some local breeds are more resistant to certain diseases than selected and so-called international or commercial ones. The N'dama cow of West Africa, for example, is immune to the fever known as trypanosomosis, caused by the bite of the tse-tse fly, while the Italian Vicentina, or Foza, of which only about 100 are left (in the 19th century there were more than 200,000 on the Asiago plateau), is the only sheep breed on Earth resistant to scrapie, a form of spongiform encephalopathy related to BSE, bovine spongiform encephalopathy, better known as "mad cow disease."

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